

$$a_n = \frac{1}{r}, 1, 2, \dots$$

۱- (۲)

(الف) $a_1 \times r^{n-1} \Rightarrow a_{10} = \frac{1}{r} \times r^9 = 254$ (ب) $a_r a_{10} = a_v \Rightarrow a_v = \frac{1}{r} \times r^9 = 27$ ✓
 (ب) $\frac{a_{1v}}{a_{1r}} = \frac{a_9 r^{1r}}{a_1 r^{1r}} = r^f = r^4 = 14$ ✓ (د) $\frac{1}{r} \times r^{n-1} = 121 \Rightarrow r^{n-1} = 254 \Rightarrow n=9$ ✓
 ← جمله نهم

$$\frac{a_0}{a_1} = \frac{12}{94} \quad \frac{a_1}{a_0} = q^r = \frac{94}{12} = 1 \Rightarrow q = r$$

۲- (۲)

$$a_0 = 12 \Rightarrow a_1 q^{0-1} = 12 \Rightarrow a_1 r^f = 12 \Rightarrow a_1 = \frac{r}{f} \Rightarrow a_{10} = a_1 q^9 = \frac{r}{f} \times r^9 = 314$$
 ✓

$$a_1 \times a_r \times a_r \times a_r \times a_r \times a_0 = 242 \Rightarrow a_r^5 = 242 \Rightarrow a_r = \sqrt[5]{242} = 3$$
 (الف) (۲)
 $a_1 \times a_0 = a_r \times a_r = 3 \times 3 = 9$ (ب) ✓

$$r^a, r^b, r^c \rightarrow r^a \times r^b = (r^c)^r \Rightarrow r^{a+b} = r^c = r^5 \Rightarrow a+b=5$$
 (۲) - ۴
 $\frac{a+b}{r} = \frac{5}{r} = 2/5$ ✓

$$\left. \begin{array}{l} a_r = 1-x \\ a_v = x \\ a_{11} = x+1 \end{array} \right\} \Rightarrow a_r \times a_{11} = a_v \times a_v \Rightarrow (x+1)(1-x) = x^2 \Rightarrow 1-x^2 = x^2$$
 (۱,۷۵) - ۵
 $\Rightarrow 2x^2 - 1 = 0 \Rightarrow 2x^2 = 1 \Rightarrow x^2 = \frac{1}{2} \Rightarrow x = \pm \sqrt{\frac{1}{2}} = \pm \frac{\sqrt{2}}{2}$

غنی و فقیر
 < ۰ و > ۰

$$a_1 + a_r = 21 \Rightarrow a_1 + a_1 q^r = 21 \Rightarrow a_1(1+q^r) = 21 \Rightarrow a_1(1+q)(1-q+q^2) = 21$$
 (۲) - ۶

$$a_r + a_v = 12 \Rightarrow a_1 q + a_1 q^r = 12 \Rightarrow a_1 q(1+q) = 12$$

$$\frac{a_1 + a_r}{a_r + a_v} = \frac{a_1(1+q)(1-q+q^2)}{a_1 q(1+q)} \Rightarrow \frac{1-q+q^2}{q} = \frac{21}{12} = \frac{7}{4} \Rightarrow 4q = 3 - 3q + 3q^2$$

$$\Rightarrow 3q^2 - 7q + 3 = 0$$

$$\Rightarrow q^2 - 7q + 9 = 0 \rightarrow (q-1)(q-9) = 0 \rightarrow q < 9$$

$$a_1(1+q^r) = 21 \leftarrow a_1(1+r) = 21 \Rightarrow a_1 = 1$$

$$a_1(1+\frac{1}{r}) = 21 \Rightarrow a_1 = 27$$

$$a_n \leftarrow 1, 3, 9, 27 \rightarrow a_r = 27: \text{بزرگترین جمله}$$

$$a_n \leftarrow 27, 9, 3, 1 \rightarrow a_1 = 27: \text{بزرگترین جمله}$$
 ✓

$$a_1 + a_r + a_r = 13 \rightarrow \frac{a_r}{q} + a_r + a_r q = 13 \Rightarrow \frac{1}{q} + r + r q = 13 \quad (2) - V$$

$$a_1 \times a_r \times a_r = 27 \rightarrow a_r^3 = 27 \Rightarrow a_r = 3$$

$$a_r \times a_r$$

$$\frac{1}{q} + 3q = 10$$

$$\Rightarrow 3 + 3q^2 = 10q \Rightarrow 3q^2 - 10q + 3 = 0 \Rightarrow q < \frac{1}{3} = r$$

$$(3q^2 - 10q + 3 = 0 \Rightarrow (q-1)(q-9) = 0$$

$$a_n \leftarrow \begin{matrix} 1 & 3 & 9 \\ 9 & 3 & 1 \end{matrix} \quad \checkmark$$

$$a_n = 2, 4, 16, \dots$$

$$(2) - \Delta$$

$$S_{10} = a_1 \left(\frac{q^{10} - 1}{q - 1} \right) = 2 \left(\frac{3^{10} - 1}{3 - 1} \right) = 3^{10} - 1 = 59049$$

$$a_1 \times a_2 \times a_3 \times \dots \times a_{10} = (a \times a_{10})^5 = (2 \times 2 \times 3^9)^5 = 2^5 \times 3^{45}$$

$$a_n = a, aq, aq^2, aq^3, aq^4, \dots$$

$$(2)$$

$$aq - a = a(q-1)$$

$$aq^2 - aq = aq(q-1)$$

$$aq^3 - aq^2 = aq^2(q-1)$$

$$a_n' = a(q-1), aq(q-1), aq^2(q-1), aq^3(q-1), \dots$$

$$\text{نسبت} = \frac{aq(q-1)}{a(q-1)} = \frac{aq^2(q-1)}{aq(q-1)} = \frac{aq^3(q-1)}{aq^2(q-1)} = q \quad \checkmark$$

$$a_1, a_1 + d, a_1 + 2d, a_1 + 3d, \dots, a_1 + (n-1)d \quad (2) - 1$$

$$a_1 + (n-1)d, a_1 + (n-2)d, a_1 + (n-3)d, \dots, a_1$$

$$rS_n = n(a_1 + a_1 + (n-1)d) \Rightarrow S_n = \frac{n}{2}(2a_1 + (n-1)d)$$

$$S_n = a_1 + a_1q + a_1q^2 + \dots + a_1q^{n-1} \quad \text{طرفین را در } q \quad S_n q = a_1q + a_1q^2 + a_1q^3 + \dots + a_1q^n$$

$$S_n - S_n q = a_1 - a_1q + a_1q - a_1q^2 + a_1q^2 - a_1q^3 + \dots - a_1q^{n-1} + a_1q^{n-1} - a_1q^n$$

$$S_n(1-q) = a_1(1-q^n)$$

$$\Rightarrow S_n = a_1 \left(\frac{1-q^n}{1-q} \right) = S_n = a_1 \left(\frac{q^n - 1}{q - 1} \right)$$